FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 754. (No. 23, Vol. XV.) JUNE 7, 1923 [Weekly, Price 6d. Post free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:

United Kingdom .. 30s. 4d. Abroad .. .. 33s. 0d.*

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

* *European subscriptions must be remitted in British currency*

CONTENTS

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

June 23	**Grosvenor Challenge Cup, Lympne**
June 25–30	**International Air Congress, London**
June 30	**R.A.F. Aerial Pageant, Hendon**
July 13–14	**Air Race for King's Cup**
July 16	**Unveiling of R.A.F. Memorial by H.R.H. The Prince of Wales**
July 20	**Gothenburg Exhibition**
Aug. 1	**Entries close from British Competitors for Schneider Cup**
Aug. 3–14	**Rhön Gliding Competition**
Aug. 6	**Aerial Derby**
Aug. 6–27	**French Gliding Competition, near Cherbourg**
Aug. 8–12	**F.I.A. Conference, Gothenburg.**
Sept.	**Light 'Plane and Glider Competitions**
Sept. 23	**Gordon Bennett Balloon Race, Belgium**
Sept. 28	**Schneider Cup Seaplane Race at Cowes**
Oct. 14	**Beaumont Cup Race at Istres, France**
Dec. 1	**Entries close for French Aero Engine Competition**
1924	
Mar. 1	**French Aero Engine Competition.**

EDITORIAL COMMENT.

"NO security is adequate which does not make us at least as strong in the air as any other nation in the world." This declaration, made by the Earl of Birkenhead at the Mansion House meeting, organised by the Air League of the British Empire, on May 30, a report of which is published elsewhere in this issue of FLIGHT, will not, we think, be seriously challenged by anyone having the slightest knowledge of the fundamental principles of national defence. In the past, when the Navy was the sure shield of this country, we were not content with anything less than a two-Power standard. The position now is that the air arm has largely resulted in our being an island no longer, and that the Navy can now no more, by itself, guarantee that security which we formerly enjoyed. Not only has our Navy been reduced to a one-Power standard, but in the air we have been allowed, under the plea of economy, to lose the leading position which we held at the end of the War. From whatever angle viewed the position is intolerable, and, as Lord Birkenhead emphasised, in the past we have never been content to allow the question of security to depend on moods and friendships.

Air Defence

We have no desire to blame France for her vigorous aviation policy. In our opinion France is absolutely right in putting every effort forward to secure her position in the air. Matters in Europe and the Near East are not in such a settled state that any nation can count upon an indefinite period of comparative peace, in spite of all the League of Nations' ideals. France realises this—and takes her precautions. We ourselves cannot do less, for any danger that might threaten France would assuredly threaten us also. Germany is at present, internally, in a position of impotence, owing to the restrictions placed upon her, but it may well be that the situation there will change. Signs are not wanting that in Russia there is feverish activity, and that the Russian Government realises that in aircraft they have an arm which can be quickly and cheaply developed. Germany, forced into aerial inactivity at home, has been diligently seeking an outlet for her aircraft industry in Russia,

and it is no longer denied that German firms have huge contracts for the establishment of factories in Russia. The situation is one fraught with the gravest dangers, and, as we have repeatedly pointed out in these columns, it would have been far better to have allowed Germany a reasonably free hand in developing her civil aviation—and even her military aviation within limits—than to impose restrictions which have had the result of forcing her constructors to go abroad, there to establish factories over which the Allies cannot exercise any sort of supervision. However the mistake has been made, and the resulting situation must be faced. It is not yet too late for this country to secure comparative safety in the air, but action must be taken very speedily to attain the one-Power standard which must, at least, be the goal to be aimed at.

◆ ◆ ◆

Research and Design

The Wilbur Wright Memorial Lecture, delivered before the Royal Aeronautical Society by Professor Joseph Ames, was of more than passing interest, and showed how vigorously America is carrying on her aeronautical research policy. As Sir Richard Glazebrook pointed out, it is sad to think that we in this country have had to reduce to a minimum research along the lines indicated in Dr. Ames's paper. Not only have we no funds for a compressed air wind tunnel like that designed by Dr. Max Munk for the American National Advisory Committee for Aeronautics, but the use of our existing tunnels has had to be kept down to a minimum owing to the expenses involved, notably in running the large Duplex tunnel. Experiments in towing large models under an aeroplane in free flight, and thus avoiding the so-called "scale effect," and, what is, perhaps, even more important, the influence of the wind tunnel walls, form another line of research which has not, up to the present, been explored in this country.

◆ ◆ ◆

What is the Matter with the R.Ae.S.?

The extremely poor attendance at the Royal Aeronautical Society's Wilbur Wright lecture must have come as a painful surprise to the lecturer. Dr. Ames had come a matter of close upon 3,000 miles to deliver this lecture personally, and was confronted with an audience numbering less than 40. We had expected the theatre of the Society of Arts to be packed, and instead we found a few odd seats occupied. When the leading American aeronautical authority takes the trouble to spend (we might almost have said waste) at least two weeks of his valuable time in coming to this country to give a lecture before our leading aeronautical body, it is to be expected that all who can possibly do so will make a point of being present, even if at some inconvenience, as a mere matter of courtesy. That the members of the Royal Aeronautical Society should, individually, have so far forgotten themselves as to allow so distinguished a lecturer as Dr. Ames to speak to empty benches is a matter for regret, not only for the discourtesy which the action implies, but equally for the lack of interest displayed.

The Royal Aeronautical Society is acclaimed as the governing body in matters relating to aeronautical science, and as such one might be forgiven for expecting its members to have some small interest in aeronautical subjects. If such interest is lacking among members of the R.Ae.S., it is small wonder that the interest of the general public is apt to flag. It is not as if the members of the R.Ae.S. had not been informed of the lecture. We understand that a reminder was sent to each of the Society's technical members, repeating the date of the lecture. Consequently they cannot plead ignorance, and the only other explanation possible seems capable of being summed up in one word, indifference. It is no manner of good pleading that these lectures are held at an inconvenient time of the day, or that it is somewhat late in the season for lectures. Nothing can excuse the lack of attendance at a lecture like Dr. Ames's, and if the members of the R.Ae.S. do not wake up there appears to be considerable danger of the status of the Society being jeopardised, and of it deserving the title which some wag suggested for it: The Royal Apathetic Society. We take it upon ourselves to apologise to Dr. Ames, and although after the reception he was given on this occasion he might be forgiven for not coming again, we hope that he will not so penalise us, and that on the next occasion he will speak to a crowded meeting.

◈ ◈

The King's Levee

AT the Levee held by His Majesty the King at St. James's Palace on June 4, the following were amongst those present: Air Marshal Sir Hugh M. Trenchard, Principal Air Aide-de-Camp (in attendance upon H.M. the King), Wing-Commander L. Greig (in attendance upon H.R.H. the Duke of York), Capt. Egardo von Schroeders, Chilean Naval and Air Attaché, Sir Samuel Instone, Mr. Mervyn O'Gorman, Air Vice-Marshal Sir Geoffrey H. Salmond, Air Vice-Marshal A. V. Vyvyan, Air Commodore Charles A. Longcroft, Air Commodore D. le G. Pitcher, Air Commodore J. M. Steel, Group Capt. F. V. Holt, Flight-Lieut. R. F. Leslie, etc. Amongst those presented to the King were: Flight-Lieut. W. R. Acland, D.F.C., A.F.C., Squadron-Leader A. R. Arnold, D.S.C., D.F.C., Squadron-Leader R. Graham, D.S.O., D.S.C., D.F.C., Flight-Lieut. F. Grave, M.B.E., Flight-Lieut. T. S. Ivens, Lieut.-Col. Frank McClean, A.F.C., Lieut. E. A. Packe, M.B.E., D.F.C., Wing-Commander L. A. Pattinson, D.S.O., M.C., D.F.C., Lieut. H. Puckle, D.F.C., Squadron-Leader J. L. Robertson, Flying Officer F. C. Savile, Flying Officer G. R. Spencer, Flight-Lieut. W. Sutherland, M.B.E., etc.

The King's Birthday Honours

IN a supplement to the *London Gazette* dated June 1, the following honours are announced:—

The King has approved the promotion of Air Vice-Marshal Sir John Maitland Salmond, K.C.B., C.M.G., C.V.O., D.S.O., to the rank of Air Marshal in the Royal Air Force, in recognition of his distinguished service in Command of the Forces in Iraq. To date June 2, 1923.

Order of the Bath

K.C.B. (Military Division).

Vyvyan, Air Vice-Marshal Arthur Vyell, C.B., D.S.O., R.A.F

C.B. (Military Division).

Longcroft, Air Commodore Charles Alexander Holcombe, C.M.G., D.S.O., A.F.C., R.A.F.

C.B.E. (Military Division).

Air Commodore Frederick Crosby Halahan, C.M.G., D.S.O., M.V.O., R.A.F.

O.B.E. (Military Division).

Squadron Leader Lionel Douglas Dalzell McKean, R.A.F
Flight Lieut. Francis John Linnell, R.A.F.
Flight Lieut. Christopher Thomas O'Neill, M.B., R.A.F.

M.B.E. (Military Division).

Flying Officer Rowland John Divers, R.A.F.
Flying Officer Leslie Hamilton, D.F.C., R.A.F.
Observer Officer Louis James Chandler, R.A.F.
No. 531 Sergeant-Major, 1st Class, Clarence Herbert Baker, R.A.F.

Air Force Cross

Squadron Leader John Kilner Wells and Squadron Leader Harold James Payn.

Air Force Medal

248043 Corp. Herbert Valentine Hughes.

FLIGHT
THE AIRCRAFT ENGINEER AND AIRSHIP

LIGHT 'PLANE AND GLIDER NOTES

Those wishing to get in touch with others interested in matters relating to gliding and the construction of gliders are invited to write to the Editor of FLIGHT, *who will be pleased to publish such communications on this page, in order to bring together those who would like to co-operate, either in forming gliding clubs or in private collaboration.*

THE Gnosspelius light 'plane, which was fully described in last week's issue of FLIGHT, made further flights during the week-end. After a few minor alterations suggested by the flights made during the previous week-end, the machine is now considered to be ready for complete tests, and she will probably be sent to Martlesham, where special facilities exist for obtaining accurate results of speed trials, etc. At Lympne on Sunday Mr. Parker again took the machine up, and so far as could be ascertained the maximum speed of the machine is in the neighbourhood of 70 m.p.h., probably over rather than under. At the same time the climb is good and the landing speed very low, while the controllability appears to be as good as can be desired.

* * *

AFTER a short delay the "Wren" designed by Mr. Manning, and built by the English Electric Company at Preston, is to be put through further tests by Squadron-Leader Maurice Wright. It seems probable that by the time this week's issue of FLIGHT is distributed further flights will have been made, although a good deal naturally depends upon the weather, as it is now intended to get as many accurate and reliable figures as possible relating to speed, speed range, climb, manœuvrability, etc.

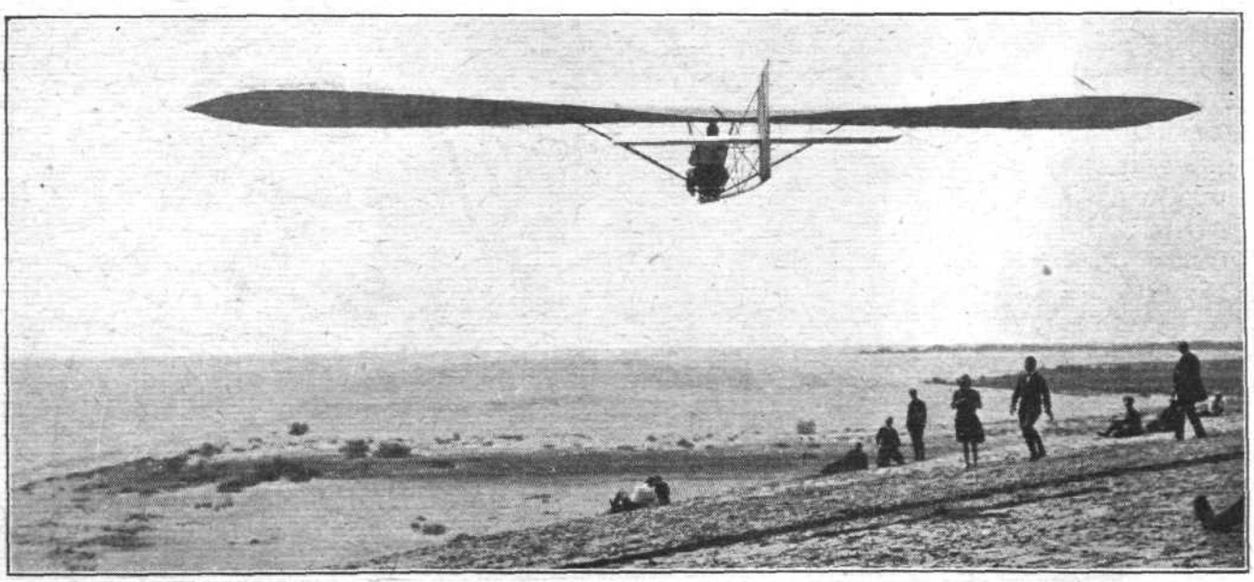
* * *

WITH reference to the design for "Turkey Buzzard," a correspondent has written in to point out that it seems likely that trouble may arise owing to one or two details in the design which do not appear to have been sufficiently carefully considered. For instance, our correspondent thinks, and we are inclined to agree with him, that the ¼ in. square diagonal spruce struts in the main plane and ailerons, which keep the trailing edge cord taut, are not stiff enough to resist the fabric tension and that of the cord. Reference to the wing drawings published in our issue of April 26 will show that these diagonal struts are to be lashed to the rib stiffeners, and that, consequently, their free length is nowhere very great. Nevertheless, it would do no harm to make them a little stouter, just to make sure.

The L.F.G. glider Phönix 3: This machine is an engineless flying boat, and is started by being towed behind a motor boat. When anchored to a buoy in a strong wind the machine will remain up as a kite.

* * *

THE second criticism offered by our correspondent relates to the end ribs in the ailerons and the adjacent edges of the main planes. On the drawings no indication is given that it is intended to make these different from the standard ribs. As our correspondent points out, there would not appear to be much point in making ribs which will stand a direct load of 264 lbs. if they are to be allowed to collapse under lateral

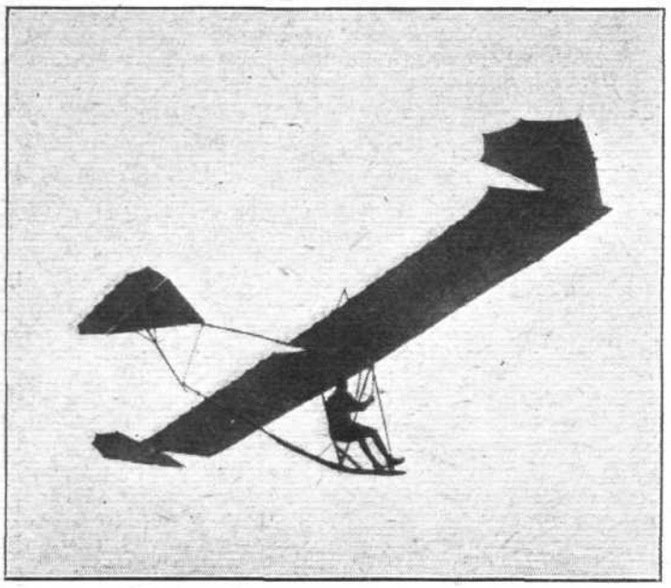


Baron von Freyberg making a flight in the Harth-Messerschmidt glider, on the coast of the Baltic.

load. It would probably be advisable to make these ribs of either box section or channel section, with webs of three-ply and flanges about 1 in. wide. This would prevent the ribs from bending inwards sideways under the pull of the doped fabric.

* * *

REFERENCE has already been made in these columns to the discussion now taking place in French aviation circles as to



The Schulz glider flying along the coast of the Kurische Nehrung, a narrow strip of sand dunes separating the Kurisches Haff (in East Prussia) from the Baltic Sea. The machine has no vertical rudder, steering as well as lateral balance being carried out by means of the wing tip flaps.

what are the desiderata of the small engine for light 'planes. The discussion was started at a meeting of the French Aerial Association, and our French contemporary *Les Ailes* has now opened its columns to a thorough ventilation of the subject. The following opinions, expressed at the meeting of the A.F.A. are of interest.

M. DEWOITINE thinks the subject may be considered under three heads. The first is what he calls the aerial motor-cycle, a light single-seater in which great refinement is of less importance than cheapness and simplicity. For machines of this type M. Dewoitine thinks an engine developing 12 to 15 h.p. will give sufficient reserve of power for all practical purposes.

* * *

FOR the sporting two-seater M. Dewoitine thinks a water-cooled engine of 25 h.p., fitted with an efficient silencer, will be the type to develop, as the passenger will object to the noise of the ordinary air-cooled open exhaust engine. Then there is the three-seater touring machine, which will, M. Dewoitine believes, have to be more comfortable, and for which he wants a water-cooled engine of 40 to 45 h.p., fitted with an efficient silencer and with a reliable engine starter so that the engine may be re-started during flight.

* * *

M. PIERRE CLERGET considers that the two all-important desiderata in a light 'plane engine are economy and reliability. He does not think we should tie ourselves down to any particular cylinder capacity, but should set ourselves the problem of carrying a given load over a given distance with the minimum consumption of fuel.

* * *

COLONEL QUINTON gave some data relating to the two-seater which M. Dewoitine is at present building. (M. Dewoitine is at present in the United States, and could not, therefore, be present at the discussion.). This machine, Colonel Quinton stated, will have a maximum speed of 130 kms. (80 miles) per hour; a range of 1,000 kms. (620 miles); a theoretical ceiling of 5,500 metres (18,000 ft.), and a useful load equivalent to one-half of the total loaded weight. *The machine is to be fitted with two engines of 15 h.p. each.*

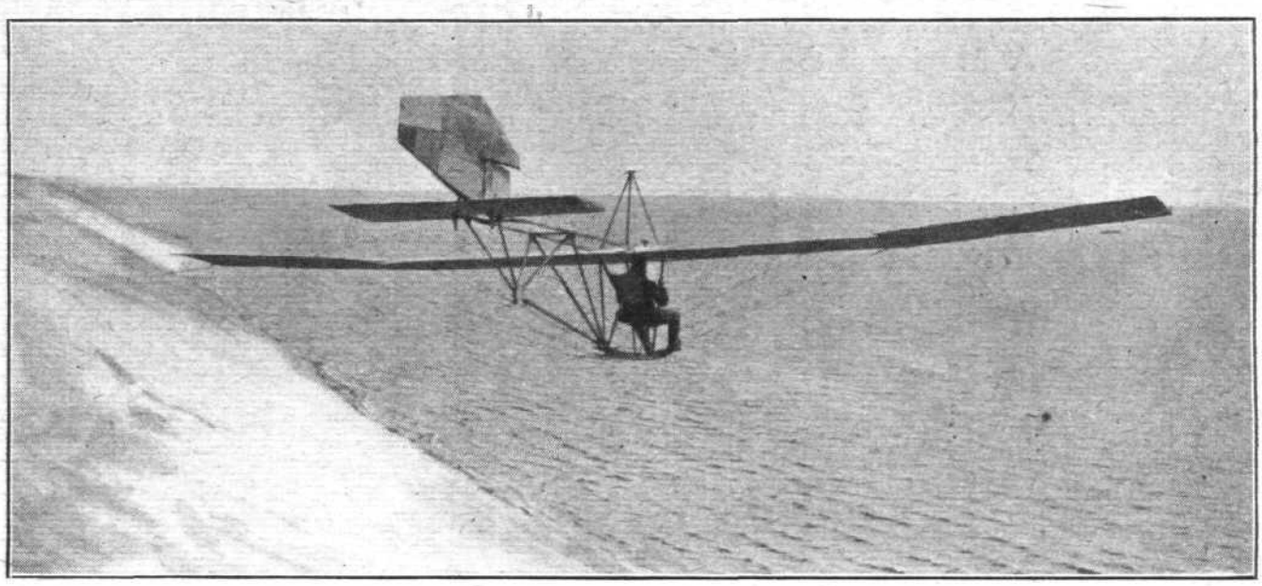
* * *

M. LOUIS DE MONGE considered a fairly high cruising speed essential, so as to enable the light 'plane to compete in speed with railways, etc. He also asked for a high ceiling, partly because this means a large excess of power available over power required, and partly so that machines could, in bad weather, get above the disturbed air of the lower levels and fly in comfort. He was in favour of twin engines, expressing the opinion that by fitting two engines the probability of engine failure is divided by four.

* * *

THE machines he had in mind would have an L/D ratio of 15 or 17, *i.e.*, be very efficient, and he outlined two types, a single-seater and a two-seater. The single-seater would have a maximum speed of 180 kms. (110 m.p.h.) and a cruising

Herr Schulz, the designer and constructor of the machine bearing his name, in the seat of his glider. The primitive arrangement of the seat will be observed. The glider is controlled by two levers, one operating the wing tip flaps and the other the elevator. There is no rudder. Herr Schulz is a school teacher in East Prussia.



HERR BERR STARTING FOR A FLIGHT IN HIS GLIDER : He got out of the rising currents, and had to alight in the sea.

speed of 150 kms. (93 m.p.h.). The useful load should be 80 kgs. (175 lbs.), and such a machine would require a propeller horse-power of 35 h.p. Assuming a propeller efficiency of 75 per cent., the actual power delivered by the engine would have to be 44 h.p. The same machine, if cruising at 100 kms. (62 m.p.h.), would require but 29 effective h.p.

* * *

THE two-seater imagined by M. de Monge would have the same speeds, but would be fitted with two engines developing 35 h.p. each. The ceiling would be 3,000 metres (10,000 ft.) *with one engine running.*

* * *

To us it seems that the subject resolves itself into finding out, by experiment, what is the smallest power with which it is possible to fly with machines as we know them today, and then, using this engine, attempt to improve the machine until less than half the power is required. We grant that for practical purposes, and for immediate use, machines would probably need considerably larger engines, but it would be a mistake to fall into the error of the early days of flying, when performance was obtained by using larger and larger engines instead of by improving the machine. If M. de Monge's advice were followed, we should simply be up to the old powerful engines in a couple of years. The lines followed will probably have to be two distinct ones. In one the object is research and experiment, with minimum power, while the other is the practical utility machine, with rather more power, but with such features as cheapness of production, small space for storing, low maintenance costs, etc., given due prominence.

* * *

THE glider and light 'plane meeting at Vauville, near Cherbourg, from August 6-27, promises to be a great success. Already no less than 27 machines have been entered, and by paying an entrance fee of 100 francs it is possible to enter up to July 1. Last week we gave the names of the first nine machines entered. The remaining are as follows : 10, André Thomas ; 11, Robert Ferber ; 12, Paul Garrouste ; 13 and 14, " Simplex " (tailless) ; 15, 16, 17, 18 and 19, M. Dewoitine ; 20, Paul Bourieau ; 21, Pierre Hees ; 22, Maurice Rousset ; 23, L. Lefort ; 24, G. Desgrandchamps ; 25, Quemin-Vaucamps ; 26, A. E. Pavin ; 27, Th. Rillet. So far no English machines have been entered.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN MAY 18 AND JUNE 1, INCLUSIVE

Route (including certain diverted journeys)	No. of flights*	No. of passengers	No. of flights carrying Mails	No. of flights carrying Goods	No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
						h. m.		
Croydon–Paris	53‡	149	15	40	53	2 48	H.P.W.8B G-EBBH (2h. 13m.)	G. (11), H.P.W.8B. (4).
Paris–Croydon	49	254	12	39	43	3 12	Goliath F-HMFU (2h. 35m.)	G. (11), H.P.W.8B. (4).
Croydon–Brussels–Cologne	27§	80	23	20	25	3 32	D.H. 34 G-EBBT (2h. 50m.)	D.H. 18 (1), D.H. 34 (4).
Cologne–**Brussels–Croydon**	26‖	93	13	10	25	4 3	D.H. 34 G-EBBT (2h. 53m.)	D.H. 18 (1), D.H. 34 (4).
Croydon–Rotterdam ...	12	5	12	12	12	2 31	Fokker H-NABH (1h. 55m.)	F. (6).
Rotterdam–Croydon ...	13	21	12	10	13	3 7	Fokker H-NABR (2h. 12m.)	F. (7).
Manchester–**Croydon–Amsterdam**	23¶	90	10	6	23	6 27	—	D.H. 34 (3).
Amsterdam–**Croydon–Manchester**	29**	60	16	17	27	—	—	D.H. 34 (3)
Total for two weeks ...	232	755	113	154	221			

* Not including " private " flights. † Including certain journeys when stops were made *en route.*
‡ Croy.–Lym. 6, Lym.–L.B. 9. § Croy.–Brus. 1, Brus.–Col. 2. ‖ Col.–Brus. 1, Brus.–Croy. 1.
¶ Man.–Croy. 2, Croy.–A'dm. 9, Croy.–Berlin 2. ** Berlin–Croy. 2, A'dm.–Croy. 17, Croy.–Man. 9.

Av = Avro. **B.** = Breguet. **Br.** = Bristol. **Do.** = Dornier. **D.H.4.** = De Havilland 4, **D.H.9.** (etc.).
F. = Fokker. **Fa.** = Farman F 50. **G.** = Goliath Farman. **H.P.** = Handley Page. **M.** = Martinsyde. **Sp.** = Spad.
Vi. = Vickers Vimy. **Vu.** = Vickers Vulcan. **W.** = Westland.

LORD BIRKENHEAD ON OUR AIR POWER

A Meeting of the Air League at the Mansion House

"THAT national security demands the establishment of a one-Power standard in the air, and our commercial prosperity the fullest development of the Imperial air routes and British civil aviation generally; and that the Air League, in its efforts to achieve these aims, is deserving of the fullest support." Thus was worded a resolution moved by Lord Birkenhead at a meeting of the Air League of the British Empire, which was held at the Mansion House on Wednesday afternoon, May 30. In the absence of the Lord Mayor—owing to his recent accident—Mr. Sheriff S. H. M. Killik presided, and in opening the proceedings referred to the fact that it was three years ago, and in the same hall, that the Air League came into being. He also read letters from Major-General the Right Hon. J. E. B. Seely, and Mr. Philip P. Foster, both of whom were unable to be present.

In moving the resolution, Lord Birkenhead said he supported the objects of the meeting because the League was undertaking, at a very important, and it might be even a critical, moment in the destinies of this country, duties and activities comparable to those which were carried out in the old days by the old Navy League.

The need for economy was great, but the need for security and the need for existence were even greater. Economy would, indeed, be of small value if the existence of the nation had previously been placed in jeopardy. In the past we could speculate as to our future in terms of absolute security so long as we had that margin of superior strength in our Navy which, reinforcing our insular position, guaranteed our safety. To-day, measured in terms of security, we were an island no longer. The security of the country could only be maintained if there were an adequate defensive force to meet any such peril in the future.

We must not assume any degree of hostility in any country, still less in the case of a nation between whom and ourselves there existed so many friendly and inflexible ties as between us and France. But we had never been content in the past to allow the question of security to depend on moods and friendships, and no Government that was responsible to the people for the safety of the country could possibly make the excuse, should at any time we find ourselves in a position of danger, that the good relationship existing at the moment between ourselves and other countries protected us.

What was the actual position today? It was that we were in a position of such hopeless inferiority that if a nation which was friendly to us, and which we believed would continue to be friendly, were, nevertheless, as the result of any misunderstanding or quarrel, to direct its air power against these shores, we should almost for the first time in our history—certainly for the first time in any recent history—be found to be entirely defenceless. No security was adequate which did not make us at least as strong in the air as any other nation in the world. The situation, as it existed today, was that we were in such a ratio as would enable us to be destroyed in the very nerve-centre of the Empire in about twelve hours. "I am not myself prepared," he said, "to accept a state of affairs which would enable any country in the world to destroy London in twelve hours. I am not prepared to run the risk, now, in five or ten years' time, or ever." While they all welcomed what Lord Salisbury said in the House of Lords, and what the Minister for Air, Sir Samuel Hoare, had said, there was still a lack of precision in any assurance that had been given to the country. They were not entitled to complain, perhaps, because the Committee of Imperial Defence had the question before them, and had not come to a final conclusion on what the air strength of the Empire should be, but those who had formed a conclusion on this matter should make it plain that they could regard as satisfactory nothing which did not provide the country with as great an air strength, measured in all the terms, as any other country in the world possessed.

Sir Alan Anderson, who seconded the resolution, said he would have liked to have seen the civil side of aviation put first in the resolution. Our ancestors had obtained mastery of the sea by developing the mercantile marine, and if we went forward and developed the commercial side of aviation we would obtain our necessary air strength in an economical manner.

Admiral Mark Kerr, in proposing a vote of thanks to Mr. Sheriff Killik, made a very impressive speech in support of the resolution. Referring to the previous speaker's remarks on developing commercial aviation first, he pointed out that things were very different now—the War had changed many things—and that in matters relating to the air we were in a peculiar position in that we had to develop the civil and the military side both at the same time. From the beginning of time animals, including man, have tried to obtain three advantages over their enemy: (1) speed; (2) range; (3) invisibility. Man, having superior intelligence, defeated the other animals, and then commenced the struggle between different groups of men. In each of the three efforts referred to man progressed steadily forward, and in each case the final word has been in the air. The laws of strategy remain the same, but the weapons have changed. He thought we were wasting millions on building battleships that would never come into action, and some of this money would be better spent in putting our military and civil aviation on a proper basis. Further economy in this direction would be achieved by having one Minister at the head of all the fighting services with the Chiefs of Staffs of each service under him. Then the money will be properly allocated, and great efficiency and economy will obtain.

Sir John Shelley-Rolls seconded the vote of thanks, which was heartily accorded by those present.

THE KING'S CUP

Circuit of Britain Handicap

THE full and final rules for the King's Cup (Circuit of Britain Handicap) race have now been issued by the Royal Aero Club, who are responsible for the organisation of this race It should be noted that the start and finish will take place at the London Aerodrome, Hendon, on Friday and Saturday, July 13 and 14—and not as previously announced. The general arrangements for this year's race are much the same as last year's. The course, approximately 800 miles, is as follows :—

Section I.—Friday, July 13.

London (London Aerodrome, Hendon)	Start.	
Birmingham (Castle Bromwich)	91	miles.
Newcastle-on-Tyne (Town Moor)	168	,,
Glasgow (Renfrew)	120	,,
Total, Section I	379	,,

Section II.—Saturday, July 14.

Glasgow (Renfrew)	Start.	
Manchester (Alexandra Park)	183	miles.
Bristol (Filton)	130	,,
London (London Aerodrome, Hendon)	102	,,
Total, Section II	415	,,

The machines will be handicapped on a time allowance basis for the complete circuit, and a proportion of the total handicap will be allotted to each section. Competitors will be started from Hendon in accordance with the proportion of their handicap allotted for the first section, and will be timed from the given signal to start. Competitors will be started on the second section in accordance with the proportion of their handicap allotted for that section, plus or minus the time gained or lost on their handicap for the first section.

The time of arrival at each Control will be taken at the moment of passing between two white crosses on the aerodrome, at a height of not more than 500 ft. This may be done in either direction, and after passing the two white crosses competitors must alight immediately and report to the official in charge and produce their Time Cards.

Competitors must make a compulsory stop of one hour and a half at each Control. At Glasgow the machines will be housed for the night. Landings between the Controls are allowed. Competitors on arriving at Hendon must cross the finishing line (a white line with white cross at each end) in flight at a height of not more than 500 ft., in either direction.

Fuller particulars are given in the complete list of Rules as to Time Cards, repairs, identification of machines, fuel supplies, etc. It may be mentioned, in conclusion, that the entry fee is £20, and this fee, together with the entry form, must be received by the Royal Aero Club, 3, Clifford Street, W. 1, not later than 5 p.m. on Friday, June 29.

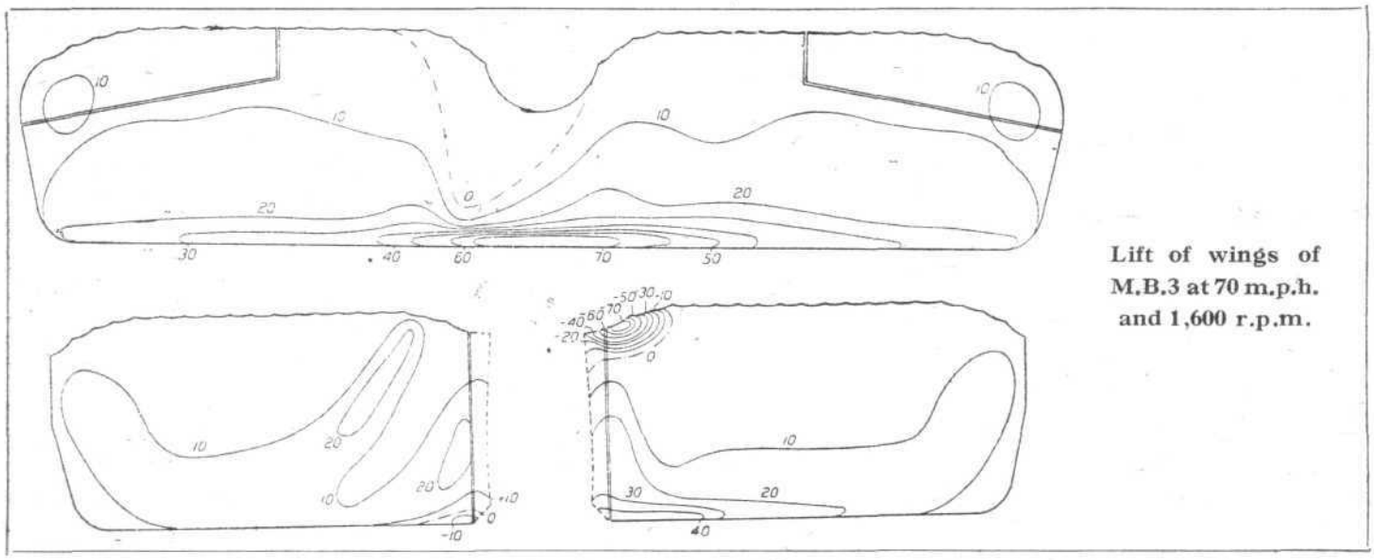
FLIGHT

RELATION BETWEEN AERONAUTICAL RESEARCH AND AIRCRAFT DESIGN

By JOSEPH S. AMES, Professor of Physics, The Johns Hopkins University ; Chairman, Executive Committee, National Advisory Committee for Aeronautics (U.S.A.).

THIS year's Wilbur Wright Memorial Lecture before the Royal Aeronautical Society was delivered by Professor Joseph Ames on May 31. Unfortunately, we have not the space to reproduce all the illustrations which were thrown on the screen, but have had to content ourselves with a selection of a few of the more interesting. We would refer those desiring to read the complete paper to the *Journal* of the Society, forthcoming issues of which will contain the unabridged paper and all the illustrations.

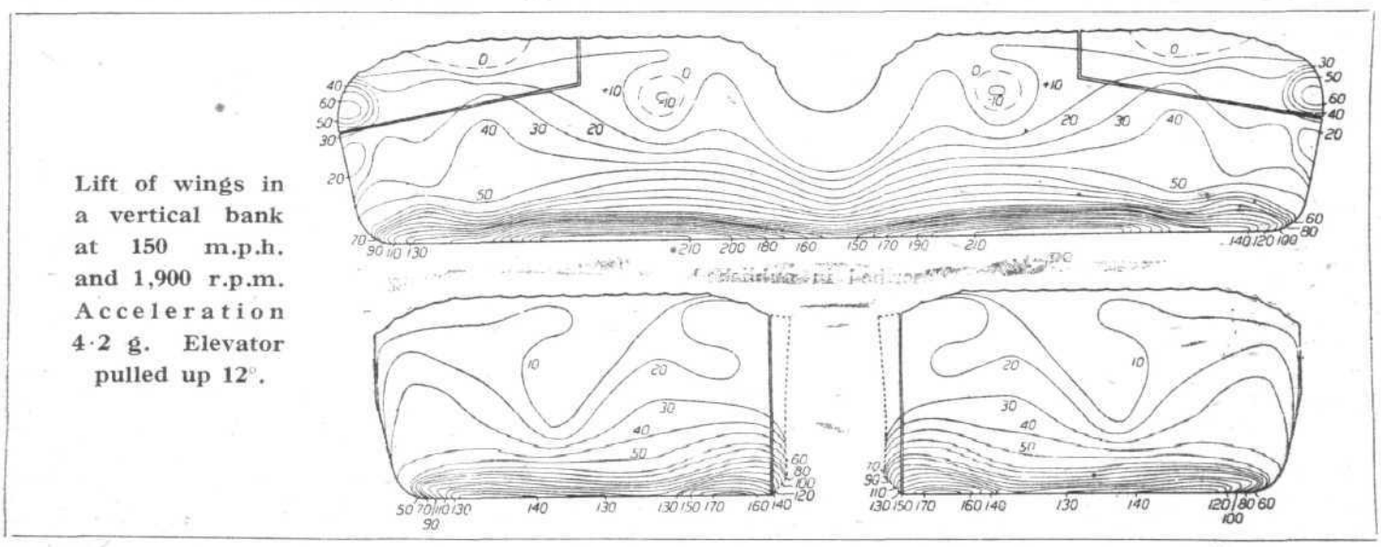
Professor Bairstow was in the chair, and in a few words introduced the lecturer. Professor Ames, he said, was



Lift of wings of M.B.3 at 70 m.p.h. and 1,600 r.p.m.

Professor of Physics at the Johns Hopkins University, and Chairman of the Executive Committee of the American National Advisory Committee for Aeronautics. Dr. Ames thus occupied a position very similar to that of Sir Richard Glazebrook in this country. It might perhaps be said that Dr. Ames was at a slight advantage—and possibly not so slight as might be imagined—in that his committee reported direct to the American President. He then called upon Dr. Ames to read his paper.

After a brief introduction, stating how he came to choose the title for his lecture, and an expression of appreciation of



Lift of wings in a vertical bank at 150 m.p.h. and 1,900 r.p.m. Acceleration 4·2 g. Elevator pulled up 12°.

the honour shown him, Dr. Ames read his paper, of which the following is a report :—

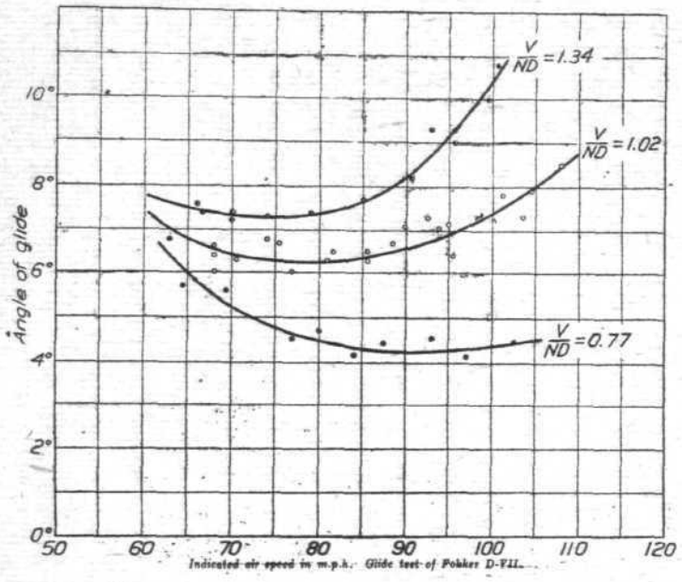
The aerodynamic laboratory with which I am connected is the Langley Memorial Laboratory, not far from Old Point Comfort, Virginia, which has been developed since 1915 by the National Advisory Committee for Aeronautics of the United States. This Committee is an independent Government agency, not under any of the Departments, but reporting directly to the President. We have a laboratory for power plant investigations ; a large wind tunnel of the type developed by the N.P.L. ; another tunnel in which the air may be compressed to twenty atmosphere or more ; excellent facilities for the design and construction of instruments ; and a large fleet of aeroplanes equipped for scientific purposes. In addition, we are able to engage the services of competent mathematical physicists familiar with aerodynamics. What we would like to do would be to give free scope to these latter, and to conduct the laboratory tests under their direction, so that theory and knowledge of facts could make progress together. But this is not possible in an establishment whose primary purpose is to give advice to other Governmental services, especially advice concerning questions raised by these services. It is true that we can often inspire these questions, and we can always, in the process of obtaining the answers, learn more than is required for the specific purpose. It follows, that while we are conducting practical tests we are also doing fundamental scientific work continuously, exactly as a justice of a high court expresses his deepest thoughts as *obiter dicta*.

As it has happened, two problems of a general nature have come to us this year from both the Army and the Navy, which, while not new at all, have led to new methods and to new knowledge. Both have an immediate bearing upon the design of aircraft ; and it was for these reasons that I selected my rather indefinite title for this lecture.

The first problem stated generally was to learn more about the distribution of forces on the parts of aircraft. It came to us in three questions :—(*a*) How is the distribution of load over a wing tip and aileron modified by changing the plan form of the wing of an aeroplane ? (*b*) Why are high-speed pursuit aeroplanes subject to certain types of accident, such as the ripping off of the linen envelope of the wings ? (*c*) What

are the forces to which the fixed and movable surfaces and the envelope of an airship are subjected when it is making manœuvres?

The first of these led to an extensive investigation in the standard wind tunnel. One series of tests was on four model aerofoils without ailerons, having square elliptical and positively and negatively raked tips; the second series was on wings having raked tips with ailerons adjusted to different settings. The models had a chord of 6 ins. and a mean semi-span of 18 ins., and the method of images, recommended in one of the British R. and M. reports, was adopted in the investigation. A large number of series of openings were made in the surfaces of the aerofoil, and each was connected to a liquid manometer. The results give a great deal of what



GLIDE TEST OF FOKKER D.7: The curves are plotted on base of airspeed in m.p.h.

is apparently new information concerning the air flow near the tip of a wing. They will soon be published both in tabular and in graphical form, so that designers can calculate with ease the distribution of lift between the ends of the wing spars, the shears and bending moments, and the aileron efficiency. Further, with the knowledge obtained, proper distribution of load in sand testing is facilitated. The most important general conclusions are that tips with a positive rake give an erratic distribution of lift near the tip of the aileron, and that this may be avoided by the use of a negative rake. Considerable new light is also thrown upon the question of aileron balance.

In order to study the air-flow about a high-speed pursuit aeroplane, a Thomas-Morse MB-3 machine was rebuilt and suitably prepared for experimentation. This has a maximum air-speed of 145 m.p.h. A large number of holes were made in the two surfaces of both the upper and lower wings; these were connected by rubber tubes to recording multiple manometers mounted in the fuselage; so in this way sixty records could be made simultaneously.

The manometer, which has been described in published reports of the Committee, consists of a series of metal capsules, across the middle of each of which is stretched a metal diaphragm. In most of the tests the two holes facing each other on opposite sides of the wing were connected to the opposite sides of the capsule; but in some cases only one hole was so connected, the other side of the capsule being joined to a reservoir in the cockpit communicating with a static tube whose opening was in the interior of the wing. Special attention was paid to the distribution of pressure in the slipstream and near the leading and trailing edges. Since there is such a great variation in pressure over a wing, each capsule was adjusted separately so as to have the proper sensibility corresponding to the opening with which it was connected. At the leading edge pressures as high as 200 lbs./sq. ft. had to be measured, while further back the pressure often did not exceed 30 lbs./sq. ft. An accelerometer, a recording air-speed meter, a control position recorder, and an electric chronometer were also installed in the aeroplane.

The information specially desired was the distribution of lift over the portions of wings in the slipstream during steady flight and that over the entire wings during violent manœuvres. Measurements were made at air-speeds of 70, 115 and 145 miles per hour at closed, medium and full throttle under conditions of steady flight, and also during three manœuvres, a roll, a flattening out of a dive and a vertical bank at 150 m.p.h.

The result can be understood most easily by the use of graphical methods. Contour lines of pressure may be drawn on a model of the wings; or, what is far more striking, three-dimensional models may be constructed.

The numbers adjacent to any contour line indicate the total pressure upward in lbs. per square foot, *i.e.*, the combination of the effects on the two sides of the wing. The relief maps also give the combined effects.

Some of the most striking facts observed are:—

1. The lift in the slipstream during steady flight is far from uniform on this aeroplane; at high air-speed and high engine-speed a lift of 100 lbs./sq. ft. was observed on the leading edge of the upper wing, while on the leading edge of the lower right wing there was an area of down pressure of 60 lbs./sq. ft.

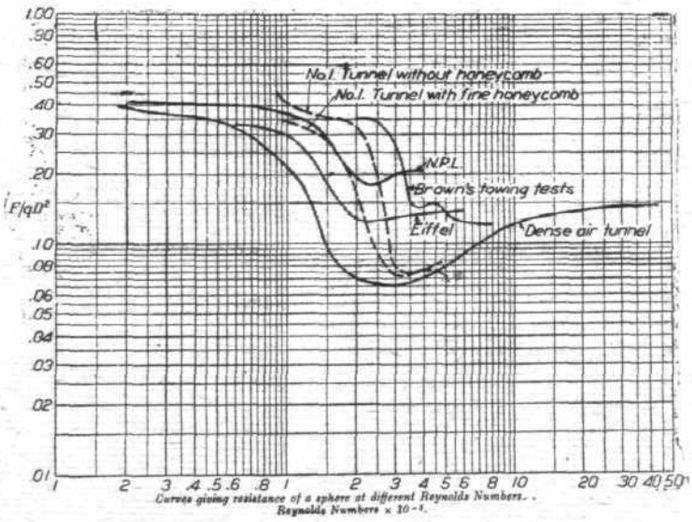
2. At low air-speed and high engine-speed, that is while climbing, there was at the trailing edge of the lower left wing, near the fuselage, a down pressure of 70 lbs./sq. ft.

3. When the suction on the upper surface of a wing was measured with reference to the air inside the wing, it was found to amount to as much as 76 lbs./sq. ft. in steady flight, whereas in one isolated point an inward pressure of as much as 24 lbs./sq. ft. was observed.

4. In flattening out of a dive the wings support only 80 per cent. of the total load on the aeroplane, whereas in a vertically banked turn at 150 m.p.h., where the acceleration rose to 4·2 g. the wings carried 90 per cent. of the load, the remainder being borne by the fuselage and tail surfaces.

5. In steady flight at 145 m.p.h. the lift per sq. ft. of the upper wing is twice that of the lower, the total lift of both wings being about 400 lbs. greater than the weight of the aeroplane, balancing the down load on the fuselage and tail. This fact is, no doubt, due to the rigging of this particular aeroplane, *i.e.*, to the angular difference between the wings and to the lower wing being almost at zero lift.

It is important to add that this MB-3 machine is a single-seater, so that the pilot has to control the machine and press the button which starts all the automatic recording devices. This investigation of the MB-3 proved so interesting and offered so many suggestions that further studies of pursuit aeroplanes have been called for; the plans are now perfected for similar investigations of the latest types of military fighting



Curves giving resistance of a sphere at different Reynolds numbers. The curves are plotted on a logarithmic base (Reynolds numbers 10-5).

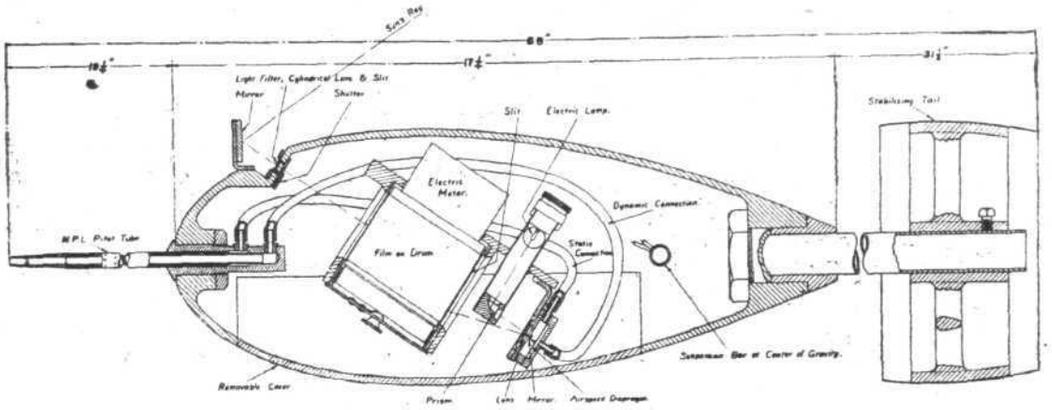
aeroplanes. One problem in this connection is to compare the inherent advantages and disadvantages of monoplane and biplane machines.

As is well known, the United States is interested in the construction of airships. The Navy has practically finished a large rigid, and the Army has well under way a semi-rigid. As is equally well known, the actual scientific knowledge of the aerodynamics of airships is not extensive. At the request first of the Navy and later of the Army, our National Advisory Committee undertook to study and report upon the airship designs made by these two services. In connection with this work one of the technical staff of the Committee, Dr. Munk, elaborated a certain theory of the airship which was distinctly novel, but led to results at variance with accepted practice.

It was evident that real knowledge could be obtained only by extensive experimentation on actual airships. What was needed primarily was a series of measurements of pressures over the envelope and surfaces of an airship when in steady flight and when making manœuvres. For this purpose a non-rigid airship, Navy type C, was placed at the disposal of the Committee. It is 200 ft. long, 40 ft. in diameter, and has 200,000 cubic ft. capacity. Pads were specially designed for the measurement of pressure. These lie practically flush with the envelope of the airship, and each consists essentially of a metal box whose top and bottom surfaces are pear-shaped, roughly 2 ins. by 4 ins., and held a distance of one-hundredth of an inch apart by means of studs; in the top plate there are grouped in a comparatively small circle

There are the three problems referred to at the beginning of this paper as requiring an elaboration of the methods for the study of pressure distribution; and no one can question the importance of the results obtained in the proper design of aircraft.

Quite a different set of questions has been asked our Committee, which lead in the end to an investigation of the so-called scale effect. Certain questions can, of course, be answered on theoretical grounds, and answered definitely; but the great majority cannot. Any aircraft is a complicated mechanism made up of many parts; all of these have definite aerodynamical characteristics; but from a knowledge of these we cannot pass to that of the machine as a whole. The question as to the changes in forces and moments with scale,



American N.A.C.A. trailing Kymograph air-speed meter.

22 holes each three-hundredths of an inch in diameter; a brass tube $\frac{1}{4}$ in. in diameter serves as an outlet from the box. This is connected by rubber or aluminium tubing to a liquid manometer in the car of the airship.

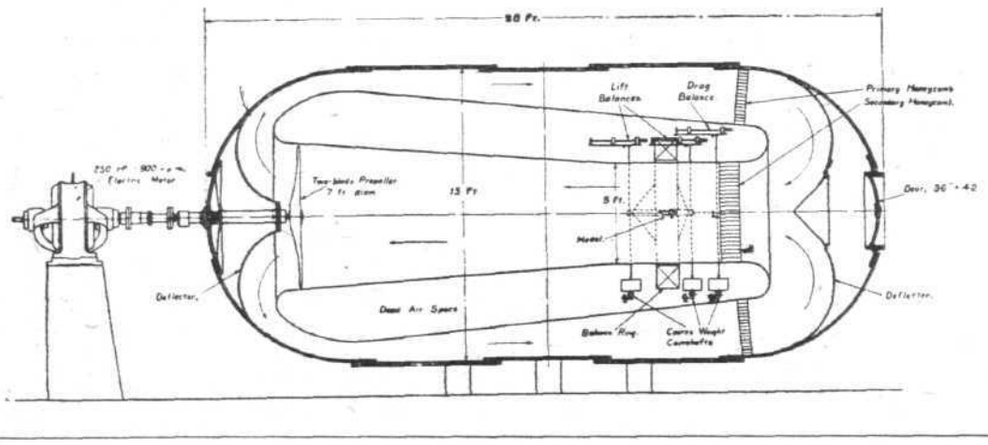
There are about 400 of these pads on the envelope and surfaces of the airship, 36 being in the bottom fin and rudder. Simultaneous reading of 260 manometers may be made photographically.

This investigation of the aerodynamics of an airship is not yet completed, but I can show you certain observations which indicate the importance and novel character of the results being obtained. One illustration shows the pressure distribution over the bottom fin and rudder in circling flight, and the other when the airship while in steady flight has its helm put hard down.

The drawings do not require much explanation, but emphasis

especially in manœuvres, is exceedingly difficult. The first investigation which should be made on scale effect is to determine which aerodynamic properties are most susceptible to the effect; after that, the number of problems to be undertaken is practically infinite.

At Langley Field our Committee has facilities for studying scale effect by four different methods, two of which are, I believe, unique. We have an ordinary wind tunnel, having a 5 ft. throat and fitted with fans so that an air-speed of 100 m.p.h. (147 ft. per second) may be used; this gives a certain Reynolds number, not very large. A larger number may be obtained by a free flight method in which a large model is suspended below an aeroplane in steady flight; we have perfected methods for suspension and measurement, and the results are, on the whole, satisfactory. To secure a still larger Reynolds number, the Committee has had constructed



Section through the American N.A.C.A. variable density wind tunnel, designed by Dr. Max Munk.

may be placed upon the results shown when circling flight is begun. When the helm is suddenly applied, and before the airship attains an appreciable angular velocity, the angular acceleration creates such a large force on the vertical fins in the opposite direction to the force on the rudder that the net force on the stern of the airship is much smaller than has been supposed hitherto. It follows that the condition of the sudden application of the rudder is not a serious one from the point of view of the stresses in the hull of the airship. Presumably the reversal of the helm, when the airship is in a steady turn, does not cause a large increase of the bending moments beyond those already existing in that condition.

during the past year a wind tunnel to operate with air compressed to 20 atmospheres or more. The tunnel proper is 5 ft. in diameter at the experimental chamber, and is enclosed in a cylindrical tank with hemispherical ends. The walls of the tunnel are hollow, providing an annular dead air space in which the balance mechanism is installed. This may be controlled automatically, or settings may be made by small electric motors, operated from outside, which attach or release heavy balancing weights by means of cams, or shift lighter weights along balance arms. The model is attached to the balance by wires, there being three balance arms for measuring lift, drag and pitching moments. The tank is 35 ft. long and

15 ft. in diameter, and weighs 83 tons. It is mounted on a concrete foundation, and is partially surrounded by a working platform. An observer on this makes settings and readings by looking into the tank through small glass windows. The density of the air in the tank is controlled by two compressors driven by electric motors. Continuous stages may be secured from one-tenth of an atmosphere to twenty atmospheres. Circulation of air is effected by a two-blade propeller of special design, 7 ft. in diameter and driven at 900 r.p.m. by a 250 h.p. synchronous motor mounted on a separate foundation outside the tank. The drive shaft is made tight against air leakage where it passes through the head of the tank by a loosely packed gland, through which oil is circulated.

The concept of such a tunnel was originated by Dr. Max M. Munk, and this particular one was designed by him; and the mechanical equipment was designed and installed by Mr. D. L. Bacon, both members of the Staff of the Committee. The latter is in charge of the operation of this tunnel as well as of other tunnels in the Committee's laboratory.

It may be of interest to note that when the tunnel is operating at its greatest density, it is equivalent in scale to a tunnel 100 ft. in diameter running at 60 miles per hour. It takes about an hour and a half to "inflate" the tank fully.

Another method for obtaining a large Reynolds number, which is used by the Committee, involves the accurate measurements of the motion of an actual aeroplane in flight. To this end the Staff of the Committee have perfected a large number of recording instruments. Among these may be mentioned a single-component accelerometer; a three-component accelerometer; a three-component angular velocity recorder; a control-position recorder; a control-force recorder; an air-speed meter; an angle of attack recorder, and an electric chronometer. The Committee owes the design of these instruments to the exceptional ability of two of its staff, Mr. F. H. Norton and Mr. H. J. E. Reid.

The latest instrument developed, and one used in work about which I shall speak later, is a form of kymograph.

It consists of a streamlined body, shaped like a bomb, from the front end of which projects an N.P.L. pitot tube, and which has a tail appendage to render the whole directionally stable. There is a transverse shaft through the centre of mass, to the two ends of which are attached suspension wires leading to winches in the cockpit of the aeroplane, so that when the latter is in flight, the kymograph may be lowered to a distance of 25 ft. so as to be in undisturbed air. In the upper forward surface of the "bomb" there is an opening closed with a cylindrical lens, outside of which is a small vertical mirror, so that the rays of light from the sun may be reflected through the lens and then through two crossed slits on to a photographic film. The pitot tube is connected to a capsule manometer, whose motions are recorded on the same film. This is wound on a drum, inside of which is a constant speed electric motor driven by a current led in through the suspension wires.

When the aeroplane is flown in a direction away from the sun, the kymograph takes a position along the direction of the relative wind, and a continuous record will be made of the angular position of the sun with reference to this direction. An observer on the ground observes simultaneously the altitude of the sun; and so one obtains a record of the angle between the flight path with reference to the air and a horizontal line. The air-speed is measured at the same time, as is also the angle of attack of the aeroplane itself. Therefore, if gliding flights are taken, values of the ratio of lift to drag may be measured at various angles of attack at known air-speeds. This method is obviously independent of vertical air currents. As an illustration of its accuracy, a chart is shown giving the values of angle of glide with reference to air-speed at different values of V/ND, in which V is the air-speed, N is the number of revolutions per second of the propeller, and D its diameter. By a preliminary model investigation it was found that the value of V/ND was 1·02 for the condition of zero torque. These, and all other "free flight" tests under the direction of the Committee, have been carried out by Mr. F. H. Norton and Mr. W. G. Brown with the aid of the Committee's most skilful test pilot, Mr. Thomas Carroll.

Unfortunately for the purposes of this paper, the compressed air tunnel was actually put into daily operation for observation purposes only about the first week in April, and so I can report the results of only two series of tests. For this reason, although I have no cause to question their accuracy, they should, I think, be regarded as provisional.

The first scale effect measurements undertaken were on spheres. There is nothing novel in this problem, but some of the results are interesting. Spheres of various sizes were studied in the two tunnels, with their supporting spindles in the direction of the airstream and at various angles to it; other spheres were towed suspended at a considerable distance below an aeroplane in flight; and finally certain spheres were taken aloft by an aeroplane on particularly quiet days and allowed to drop, their motion being determined by theodolite observations from the ground.

This test was undertaken both to obtain large Reynolds numbers and to investigate the condition of turbulence in the new wind tunnel. If time were available, I would call attention to several interesting features of these curves.

The second test on the subject of scale effect was made with reference to a type of aeroplane using thick wings and having small parasite resistance. A Fokker D-7 was selected for this purpose. An aeroplane was equipped with suitable apparatus, and a model of one-fifteenth scale was made which was fitted with its proper propeller. Series of measurements on models and in full flight have been made, the aerodynamic characteristics of lift and drag being measured.

If the use of these scale effect methods justifies our present hopes, we shall be able in a comparatively short time to place at the disposal of the designer of aircraft a wealth of information which should increase markedly the accuracy of his work.

Sir Richard Glazebrook said that many years ago, more than he cared to think of, he and Dr. Ames had been fellow students, at any rate as regards the subjects they studied, which were very different from that of aerodynamics. Our thanks, he thought, were due to Dr. Ames for having succeeded in impressing upon the proper authorities the very great importance of research work. He believed work of the kind indicated in the lecture was of vital importance, and expressed regret that this country had not been able to carry on, notably with airship experiments. He recalled the first occasion on which a lecturer before the Royal Aeronautical Society had shown slides of pressure plotting over the surface of a wing. That was some ten or twelve years ago, and the lecturer was Professor Petavel. It was sad to realise that we had not been able to continue the work, and unless we set to work at once on similar lines to those indicated by Dr. Ames we should get left behind.

◈ ◈ ◈ ◈

THE INTERNATIONAL AIR CONFERENCE.

THE preliminary programme of the International Air Congress, which is to take place in London from June 25 to 30, is as follows:—

Monday, June 25 (*morning*).—Opening Ceremony at the Institution of Civil Engineers, Great George Street, Westminster. Inaugural address by His Grace the Duke of Sutherland. *Afternoon.*—Simultaneous Sessions of Groups A, B, C and D, for reading and discussion of papers at the Institution of Civil Engineers

Tuesday and Thursday, June 26 *and* 28.—Visits by members to various places of aeronautical interest.

Wednesday, June 27 (*morning and afternoon*).—Simultaneous Sessions of Groups A, B, C and D for reading and discussion of papers at the Institution of Civil Engineers.

Friday, June 29 (*morning and afternoon*).—Simultaneous Sessions of Groups A, B, C and D for reading and discussion of papers at the Institution of Civil Engineers.

Saturday, June 30 (*morning*).—Concluding meeting of members in General Assembly, under the chairmanship of the Secretary of State for Air (Lieut.-Col. the Right Hon. Sir S. J. G. Hoare, Bart., C.M.G., M.P.), at the Institution of Civil Engineers, Great George Street, Westminster.

The programme of evening entertainments for the members of the International Air Congress is now, we understand, complete. In addition to the items shown on the official programme, which we are able to publish below, a number of private dinners are being arranged. Any reader wishing to attend any of the official functions should communicate with the General Secretary, International Air Congress, 7, Albemarle Street, London, W. 1.

Monday, June 25, 9.0 *p.m.*—Reception by the President (His Royal Highness the Duke of York, K.G., K.T.), in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue, S.W. 1.

Wednesday, June 27, 9.0 *p.m.*—Reception by the Lord Mayor at the Mansion House.

Thursday, June 28, 10.0 *p.m.*—Reception by His Grace the Duke of Sutherland (Chairman of the Congress Main Committee) at Hampden House.

Friday, June 29, 9.0-11.0 *p.m.*—Visit to the Science Museum, Exhibition Road, South Kensington.

Saturday, June 30, 8.15 *p.m.*—Banquet in the King Edward VII Rooms, Hotel Victoria, Northumberland Avenue.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, May 29, 1923

General Duties Branch

The following are granted short service commissions as Flying Officers for seven years on active list, with effect from, and with seny. of, May 14 :—H. J. M. Berthon (Sub-Lieut., R.N., retd.), S. P. George (Lieut., Indian Army, retd.), H. R. B. Howell (Lieut., R.N., retd.), J. B. Knocker (Lieut., Indian Army, retd.), G. McClintock (Lieut., R.N., retd.), L. W. H. Phillips (Lieut., R.N., retd.), H. V. Smith, D.C.M. (Lieut., R.A.R.O., Sherwood Foresters), F. P. Smythies (Lieut., R.N., retd.), O. K. S. Webb (Sec. Lieut., R.A.R.O., R. Irish Fus.).

The following are granted short service commissions as Pilot Officers on probation, with effect from, and with seny. of, May 14 :—F. Boston, A. R. Buchanan, H. I. Cozens, D. T. H. Hooke, A. S. Lewis, J. H. Pledger, J. R. Pocock, H. M. Schofield, R. T. Taaffe, N. J. Wiltshire.

Wing Commander I. T. Courtney, C.B.E., is restored to full pay from half-pay ; May 25.

Stores Branch

K. R. Money, O.B.E., is granted permanent commn. as Flying Officer for Accountant duties ; April 11, 1921. since promoted. (*London Gazette* of April 25, 1922, appointing him to short service commn. is cancelled.)

Reserve of Air Force Officers

The following are granted commns. on probation in ranks stated in General Duties Branch (May 29) :—

Class A.—Flying Officers.—A. M. Alexander, A.F.C., G. Colledge, L. P. Coombes, D.F.C., G. F. Court, H. Hickson, G. J. King, R. G. Lawson, J. M. Leach, H. A. Mason, L. Rimmer, M.M., C. T. Robinson, J. S. Stubbs, D.F.C., A.F.C., W. D. Thom, D.F.C., W. F. P. Williamson, L. A. Wingfield, M.C., D.F.C.

Pilot Officers.—E. A. Burbidge, K. L. Graham, H. B. Hampson, F. A. Ledgard, O. H. P. Lloyd, C. A. McIntosh, W. Mullen, H. Preston, R. G. Spencer, J. E. Taylor, W. A. Warwick, C. M. Willy.

Memorandum

The permission granted to Lieut. S. M. Pemberton to retain his rank is withdrawn on his joining the Army ; Nov. 18, 1921.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the R.A.F. are notified :—

Stores and Accountants Branch

Squadron Leader (Stores) : W. J. Shields to Headquarters, Iraq Command. 20.4.23.

Flight Lieut. (Accountants) : K. R. Money, O.B.E., to No. 100 Squadron, Spittlegate. 1.6.23.

Flying Officers (Stores) : F. E. C. Finzel to R.A.F. Depot. 18.5.23 ; on transfer to Home Establishment, pending transfer to Reserve. R. Blackith to No. 5 Wing Headquarters, Biggin Hill. 1.6.23.

Flying Officer (Accountants) : R. D. Robbins to No. 39 Squadron, Spittlegate. 1.6.23.

Medical Branch

Group Captain : N. J. Rochs, O.B.E., to No. 1 School of Technical Training (Boys), Halton. 18.6.23 ; for duty as Principal Medical Officer.

Squadron Leader : H. A. Hewat, M.B., D.T.M., to Baghdad Combined Hospital, Iraq. 1.4.23.

Flight Lieutenants : T. Sheehan to R.A.F. Base, Calshot. 14.5.23. T. J. Thomas, M.B., to Basrah Combined Hospital, Iraq. 15.3.23. D. McLaren, M.B., to Baghdad Combined Hospital, Iraq. 1.4.23. P. A. Hall, M.B., B.A., to Baghdad Combined Hospital, Iraq. 1.3.23. T. Montgomery, M.B., D.P.H., B.A., to R.A.F. Depot (Non-effective Pool). 18.3.23 ; on transfer to Home Establishment.

Flying Officers : K. R. Smith, M.D., D.P.H., to School of Naval Co-operation Lee-on-Solent. 14.5.23. (Since promoted).—W. E. Barnes to Station Commandant, Iraq. 1.4.23. G. R. Nodwell, M.B., to Basrah Command Hospital, Iraq. 30.3.23. J. B. Gregor to Aeroplane Experimental Establishment, Martlessham Heath. 28.5.23.

◈ ◈ ◈ ◈

IN PARLIAMENT

Defence Forces and Co-ordination

CAPT. W. BENN on May 30 asked the Prime Minister whether the Report of the Weir Committee on the Education of the Fighting Services has been published ; and whether its recommendations have been given effect to ?

Mr. Gwynne : I have been asked to reply. I assume that the question refers to the Committee on the Co-ordination of the Technical Services of the Navy, Army, and Air Force, since that Committee dealt with Educational Services amongst the rest. The answer to the first part of the question is in the negative, and to the second part generally in the affirmative.

The decisions of the Government are as follows :—

(1) In existing circumstances, the complete or partial amalgamation of the common Services of the three Fighting Departments is not advisable, as no substantial economies would thereby be effected.

(2) *Medical Services.*

(*a*) A Joint Committee, consisting of the heads of the Medical Departments of the Navy, Army, Air Force and Ministry of Pensions, together with such other persons as may be nominated by those Departments, should be established to discuss matters affecting the Medical Services of the four Departments.

(*b*) The terms of reference of the Committee should be to advise upon :—

(i) important questions of medical policy such as the construction of new hospitals ;

(ii) the provision of facilities for common training ;

(iii) specifications for the supply of medical stores and appliances ;

(iv) the use of Navy, Army, and Air Force hospitals for the accommodation of disabled War pensioners ; and

(v) all matters in respect of which economies might be effected by the co-operation of the four Departments.

(3) *Chaplains' Services.*

A Joint Committee composed of the heads of the Chaplains' Departments, together with such other persons as may be nominated by the Admiralty, War Office, and Air Ministry, should be set up. The Committee should meet periodically to discuss matters of common interest from the point of view of economy.

(4) *Educational Services.*

(*a*) Instead of setting up new schools for the study of new weapons and appliances, existing establishments should, as far as possible, be made use of, new classes being added to them as and when necessary.

(*b*) A Joint Committee, consisting of representatives of the Educational Branches of the Navy, Army, and Air Force, together with a representative of the Board of Education, should be set up to consider and advise on educational matters affecting the three Services.

(5) *Intelligence Services.*

An Inter-departmental Committee should be set up, on which all the Departments of State concerned should be represented, to enquire into the question of the co-ordination of the Services maintained for the collection of political intelligence, and information connected with trade, shipping, and the security services, with a view to preventing duplication.

(6) *Supply Services.*

(*a*) Five technical co-ordinating Committees should be appointed to meet at definite intervals to deal with :—

(i) Foodstuffs.

(ii) Clothing and textiles.

(iii) Mechanical transport.

(iv) General stores.

(v) Medical and veterinary stores.

(*b*) Special Sub-Committees of those Committees should be appointed to conduct detailed investigations with regard to particular items of supply.

(*c*) The terms of reference of those Technical Co-ordinating Committees should be to consider :—

(i) The adoption, wherever possible, of trade standards and patterns for commodities and stores common to and in use by the three Services.

(ii) The standardisation, wherever practicable, of the specifications and design of commodities and stores common to and in use by the three Services for which a trade pattern is unsuitable.

(iii) The co-ordination of the methods and procedure of inspection.

(*d*) The Technical Co-ordinating Committees should be composed of one or more representatives for each Committee from each Service, who should be technical officers of rank and experience and with a knowledge of Service practice.

In cases where other Government Departments are large purchasers of similar stores, representatives from those Departments should be added as associate members.

(*e*) A business man of repute and standing, chosen from a panel selected by the Federation of British Industries or other representative organisation, or from the associate members of the existing War Office Technical Committees, should be associated with each of the new committees.

(*f*) The attention of the Contracts Co-ordinating Committee should be drawn to the Technical Co-ordinating Committees the establishment of which is recommended above, and they should refer to those Committees all suggestions for co-ordination of design and pattern and act generally in consultation with them.

(*g*) The agency system, whereby one Department purchases from another stores or commodities, which owing to any combination of circumstances that Government Department is in a better position than the other to obtain, should be encouraged and developed, *e.g.*, the particular case of furniture supplied by the Office of Works should receive immediate investigation by the appropriate Technical Co-ordinating Committee.

(*h*) The Treasury should investigate the financial difficulties which at present prevent a full use being made by Departments of the agency system.

(7) *Transport Services.*

(*a*) The absorption of the mechanical transport of mobile units of the Air Force into the Army mechanical transport service is inadvisable.

(*b*) An *ad hoc* Committee composed of representatives of the Admiralty, War Office and Air Ministry should be appointed to enquire into the question of the expediency of arranging for the provision by one of the Services of the mechanical transport requirements of the others at certain stations.

(8) *Works Services.*

(*a*) To ensure close and constant co-operation between the various Works Branches, a Joint Committee composed of representatives of the Works Branches of the Admiralty, War Office and Air Ministry and of His Majesty's Office of Works should be set up.

(*b*) The terms of reference to that Committee should be :—

(i) To ensure free interchange of information and uniformity of procedure in respect of contracts, supply of stores for structural work, etc.

(ii) To ensure co-ordination in methods of economical construction and design.

(iii) To ensure that the interests and convenience of all the Works Branches are studied when large programmes of work are undertaken by one of them.

(iv) To ensure that the resources of each Branch in respect of technical matters for which it maintains an expert staff are made full use of by the other Government Works Departments.

(v) To consider, before large building schemes in the United Kingdom are undertaken by Government Departments, whether it would not be advantageous to entrust the execution of such schemes to the Office of Works.

(*c*) To ensure the economical appropriation and use of Government buildings, a separate Joint Committee composed of representatives of the Admiralty, War Office, Air Ministry, and His Majesty's Office of Works should be set up.

(*d*) The terms of reference of that Committee should be :—

(i) To meet periodically to discuss schemes for general inspection of accommodation.

(ii) To circulate information as to prospective vacation of premises.

(iii) To consider demands for additional accommodation.

(iv) Generally to ensure the economic allocation and utilisation of accommodation.

(9) In order to ensure that the proposed Co-ordinating Committee and the existing Contracts Co-ordinating Committee are fully and effectively used, their proper functioning should be regarded as a special responsibility of the heads of the branches dealing with the service in question in the three Departments ; and each Committee should furnish an annual report upon its work for submission to the Secretaries of State and the Treasury.

Inter-Departmental Committees are being set up accordingly.

"Valentia" Tested at Cowes

LAST week successful flights were made at Cowes with the Vickers-Saunders flying boat "Valentia." Piloted by Capt. Cockerell, the well-known Vickers pilot, the machine attained a speed of 100 knots. The "Valentia" is fitted with two Rolls-Royce "Condor" engines of 650 h.p. each, and has a span of 112 ft. and a total loaded weight of 18,500 lbs.

The "Ayr" Nearing Completion

THE flying boat designed by Mr. W. O. Manning (who also designed the "Wren"), and built by the English Electric Co. at Preston, is now nearing completion. Beyond stating that the machine is fitted with a Napier "Lion" engine, it is not permissible to give details, as the boat has been built for the Air Ministry.

Trials of Large U.S. Semi-Rigid Airship

THE United States Army training airship C-type-1—an illustration of which appeared in our issue for April 19 last—the largest non-rigid ship ever built in America, has begun her trial flights at the Goodyear Akron Air Station, under the supervision of a crew of officers and men from Scott Field, Belleville, Illinois.

The T-C-1, as she is officially known, is the first of three ships of this type being built for the U.S. Army by the Goodyear Tyre and Rubber Company, and will be used as a training ship for airship pilots in preparation for several trans-Continental flights contemplated for this and other ships of this type. The crew which carried the T-C-1 through its preliminary tests was composed of Lieut. F. M. McKee, test and instruction pilot, Lieut C. Kunz, test pilot and engineering assembly officer, both of Scott Field, Belleville, Illinois, Lieut. J. Cluck, official observer and pilot of the Air Service, Washington, D.C., Sgt. Harry Barnes and Sgt. Olin Brown, motor specialist from Scott Field. On completion of all trials the T-C-1 will be flown to Scott Field, Belleville, Illinois, where she will be stationed as a training ship for airship pilots.

Oemichen Remains Up for 9 Minutes.

M. OEMICHEN has succeeded in remaining hovering in his helicopter for 9 minutes. As he has already accomplished a closed circuit on this machine, it begins to look as if the question of controllability is in a fair way of being solved. There still remains the greatest problem of all: to descend safely with engine stopped.

Barbot in America.

FOLLOWING on his double crossing of the Channel, and his flight from St. Inglevert to Le Bourget, M. Barbot has taken the Dewoitine to America at the invitation of the *Chicago Tribune*. His mission is, it seems, to popularise low-power flying in the States, and he may possibly attempt a flight from Chicago to New York.

On Monday, June 4, M. Barbot made a flight in America of slightly over 100 miles in his Dewoitine light 'plane, with which he recently crossed the Channel. Leaving the Garden City Aerodrome, he flew to West point and back without alighting, a total distance of about 110 miles. His fuel consumption is stated to have been less than two gallons of petrol.

Smith Instruments for Gliders

HAVING achieved a world-wide reputation with their various instruments for military and civil aircraft, it is only to be expected that S. Smith and Sons (M.A.), Ltd., of Cricklewood, have lost no time in turning their attention to the production of special instruments for the lastest development of aircraft, *i.e.*, gliders and light 'planes.

The new Smith altimeter for gliders and light 'planes has a dial only 3 ins. in diameter, and reads to 8,000 ft. or corresponding metres. Although very little bigger than the standard eight-day watch familiar to all pilots, this new altimeter is exceedingly accurate and quite reliable. The Smith airspeed indicator for gliders has been on the market now for some eighteen months, and was used by competitors in the last glider contest. It has a special low reading scale recording air-speeds from 10 to 80 miles per hour, or corresponding kilometres. The new light 'plane revolution counter is of a lighter type than the standard R.A.F. model still manufactured by Smiths, and dispenses with the heavy and expensive gear-box used on the standard type. A flexible drive is fitted at the engine end with a special shaft-end fitting which couples direct on to the crankshaft or magneto spindle. The instrument itself is geared either 1-1 or 2-1 according to whether the drive is taken, and is exceedingly accurate at all speeds. It may be interesting to note that many ex-service pilots owning cars are equipping these with one of the Smith air-speed indicators in addition to the ordinary speedometer. The combination of these instruments is rather useful, inasmuch as it is possible, by noting the difference between the road speed indicated on the speedometer and the air speed shown on the air-speed indicator, to calculate the head wind against which the car is travelling.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS
(London Aero Models Association)

FINE weather and sixteen competitors made the Weston Challenge Cup Competition, which was held last Sunday at Parliament Hill, a very interesting event. The light westerly wind was not helpful, as it blew right across the course, but some very fine glides were made. The results were as follows: 1, C. Bayard Turner, 22⅕ secs.; 2, W. E. Evans, 17⅗ secs.; 3, L. Lansdown, 17⅖ secs.

On Saturday, June 16, the fourth round of the D. H. Pilcher Challenge Cup Competition will be held, on Hackney Marshes, at 4 p.m., if sufficient entries are received.

A. E. JONES, Hon. Sec.

PUBLICATIONS RECEIVED

Nature, No. 2,795, *Vol. III.* MacMillan and Co., Ltd., St. Martin's Street, W.C. 2. Price 1*s.*

Department of Overseas Trade. Report on the Economic, Financial and Industrial Conditions of the Netherlands to February, 1923. By R. V. Laming, O.B.E. London: H.M. Stationery Office, Kingsway, W.C. 2. Price 2*s.* net.

Revue Juridique Internationale de la Locomotion Aérienne. May, 1923. Edition Aérienne, 4, Rue Tronchet, Paris.

In the Supreme Court of the District of Columbia. Law No. 67540. *James V. Martin, Plaintiff, v. The Manufacturers' Aircraft Association, Inc., et al., Defendants.* James V. Martin, Garden City, L.I., New York, U.S.A.

Aeronautical Research Committee, Reports and Memoranda:

No. 799 (Ae. 54). Experiments on a Model of Rigid Airship, R.38. By R. Jones, M.A., and D. H. Williams, B.Sc. May, 1920. Price 1*s.* 0½*d.* post free.

No. 800. Report of the Airship Stressing Panel. August, 1922. Price 2*s.* 7*d.*, post free.

No. 818 (Ae. 69). Test of Ten Aerofoil Sections for Metal Airscrews. By I. L. Peatfield. March, 1922. Price 6½*d.*, post free. London: H.M. Stationery Office, Kingsway, W.C. 2.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl = cylinder; I.C. = internal combustion; m. = motor
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1922

Published June 7, 1923

4,563. BARR AND STROUD, A. BARR and W. STROUD. Inclinometers. (197,425.)

14,186. SOC. RATEAU. Fluid pressure turbines. (191,360.)

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free...	7	7	3 Months, Post Free...	8	3
6 " " ...	15	2	6 " " ...	16	6
12 " " ...	30	4	12 " " ...	33	0

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

** European subscriptions must be remitted in British currency*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.*